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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/998,518	11/29/2001	Paul Rabinowitz	102360-230-NP	5383

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EXAMINER	
BARAN, MARY C	
ART UNIT	**PAPER NUMBER**
2857	

DATE MAILED: 12/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/998,518	RABINOWITZ ET AL.
	Examiner	Art Unit
	Mary Kate B Baran	2857 AW

-- The MAILING DATE of this communication app ars on the cover sh t with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 25 February 2002.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-24 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-10 and 12-24 is/are rejected.

7)☒ Claim(s) 11 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Information Disclosure Statement

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Specification

2. The disclosure is objected to because of the following informalities:

(a) On page 4 line 4, "Press, et al" should be – Press et al. –.

(b) On page 4 line 23, "Zee, et al" should be – Zee et al. –.

(c) On page 4 line 29, "thus, removed" should be – thus removed –.

(d) On page 5 line 6, "background and" should be – background, and –.

(e) On page 10 line 27, "such as distributed" should be – such as a distributed –.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-7, 10, 12-21, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zare et al. (U.S. Patent No. 6,532,071) (hereinafter Zare) in view of Collins et al. (U.S. Patent No. 5,291,426) (hereinafter Collins).

Referring to claim 1, Zare teaches a method for determining an exponential decay rate of a signal in the presence of noise (see Zare, column 7 lines 12-15), said method comprising: receiving an exponentially decaying signal from a detector (see Zare, column 7 lines 37-42); digitizing said signal to form a first array of data points (see Zare, column 7 lines 37-42); estimating a baseline value of said signal by averaging a final fraction of said data points (see Zare column 7 lines 19-21); subtracting said baseline value from said first array to generate a second array (see Zare, column 7 lines 28-30); scaling an ordinate value of said last data point by a factor greater than unity to determine a new first data point for a baseline fit on said first array (see Zare, column 7 lines 25-27); and determining said decay rate of said signal (see Zare, column 12 lines 1-3). Zare does not teach identifying a last data point on said second array occurring before a negative or nil valued data point on said second array; fitting remaining data on said first array to a straight line to determine an estimate for a sloping baseline and said noise; subtracting said straight line from said data points to establish a resulting array; identifying a last data point on said resulting array occurring before a negative or nil valued data point on said resulting array; or performing a logarithmic transformation of said resulting array up to said last data point on said resulting array.

Collins teaches identifying a last data point on said second array occurring before a negative or nil valued data point on said second array (see Collins, column 5 lines 43-55); fitting remaining data on said first array to a straight line to determine an estimate for a sloping baseline and said noise (see Collins, column 4 lines 46-53); subtracting said straight line from said data points to establish a resulting array (see Collins, column 4 lines 56-59); identifying a last data point on said resulting array occurring before a negative or nil valued data point on said resulting array (see Collins, column 5 lines 43-55); and performing a logarithmic transformation of said resulting array up to said last data point on said resulting array (see Collins, column 7 line 68 – column 8 line 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Zare to include the teachings of Collins because using the above specified method would have allowed the skilled artisan to generate spectral data corrected for background level and ascertaining the background level with minimized bias and catastrophic occurrences (see Collins, column 2 lines 30-37).

Referring to claim 2, Zare teaches all the features of the claimed invention except for determining said decay rate of said signal by a weighted least squares fit to said transformed data.

Collins further teaches determining said decay rate of said signal by a weighted least squares fit to said transformed data (see Collins, column 2 lines 52-59).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Zare to include the teachings of Collins because applying

a least squares fit curve to the data would have allowed the skilled artisan to match the closest possible line curve to the collected data.

Referring to claim 3, Zare teaches all the features of the claimed invention except that said weighted least squares fit includes weighting each transformed data point inversely proportional to a square of said value of said digitized signal minus said estimated baseline value.

Collins teaches that said weighted least squares fit includes weighting each transformed data point inversely proportional to a square of said value of said digitized signal minus said estimated baseline value (see Collins, column 4 lines 46-59).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Zare to include the teachings of Collins because subtracting a baseline would have allowed the skilled artisan to determine the noise in the collected data.

Referring to claim 4, Zare further teaches that said signal is generated in a ring-down cell (see Zare, column 8 lines 55-57).

Referring to claim 5, Zare teaches that said ring-down cell includes two of more mirrors in any geometry that produces a stable optical cavity (see Zare, Figure 3 "mirrors 112-116").

Referring to claim 6, Zare teaches that said detector includes a photodetector (see Zare, column 7 lines 33-36).

Referring to claim 7, Zare teaches removing transient points from said first array (see Zare, column 5 lines 50-55).

Referring to claim 10, Zare teaches that noise includes broadband noise and excess low frequency noise (see Zare, column 12 line 67 – column 13 line 5).

Referring to claim 12, Zare teaches energizing said ring-down cell (see Zare, column 7 lines 9-10).

Referring to claim 13, Zare teaches that the energizing step includes utilizing a laser (see Zare, column 6 lines 64-67).

Referring to claim 14, Zare teaches that said laser is a continuous wave laser (see Zare, column 6 lines 64-67).

Referring to claim 15, Zare teaches that said laser is a pulsed laser (see Zare, column 8 lines 37-38 "P CRDS" (pulsed laser source)).

Referring to claim 16, Zare teaches a rind-down cavity system (see Zare, column 6 lines 64-66) for determining an exponential decay rate of a signal in the presence of noise (see Zare, column 7 lines 12-15) comprising: a ring-down cavity (see Zare, column 8 lines 55-57); a light source for injecting light into said cavity (see Zare, column 7 lines 9-10); a detector (see Zare, column 7 lines 33-36); a digitizer (see Zare, column 7 lines 37-39); and a processor for determining said decay rate (see Zare, column 7 lines 39-42). Zare does not teach fitting a straight line to a curve associated with said decay rate at a time greater than where a negative or nil value is detected, removing undesirable data associated with said noise and logarithmically transforming said data.

Collins teaches fitting a straight line to a curve (see Collins, column 4 lines 46-53) associated with said decay rate at a time greater than where a negative or nil value is detected (see Collins, column 5 lines 43-55), removing undesirable data associated with said noise (see Collins, column 4 lines 56-59) and logarithmically transforming said data (see Collins, column 7 line 68 – column 8 line 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Zare to include the teachings of Collins because using the above specified method would have allowed the skilled artisan to generate spectral data corrected for background level and ascertaining the background level with minimized bias and catastrophic occurrences (see Collins, column 2 lines 30-37).

Referring to claim 17, Zare teaches that the light source is a laser (see Zare, column 8 lines 61-66).

Referring to claim 18, Zare teaches that the laser is a pulsed laser (see Zare, column 8 lines 37-38 "P CRDS" (pulsed laser source)).

Referring to claim 19, Zare teaches that said laser is a continuous wave laser (see Zare, column 6 lines 64-67).

Referring to claim 20, Zare teaches that said detector includes a photodetector (see Zare, column 7 lines 33-36).

Referring to claim 21, Zare teaches removing an estimated value of said noise from said signal (see Zare, column 7 lines 28-30).

Referring to claim 23, Zare teaches a method of measuring the decay rate of a signal having noise (see Zare column 7 lines 12-15), said method comprising: measuring a data signal having noise (see Zare, column 7 lines 37-42); forming a data array having data values associated with said signal (see Zare, column 7 lines 37-42); subtracting undesirable data values from said array (see Zare, column 7 lines 28-30); establishing a resulting array (see Zare column 7 lines 28-30); and determining said decay rate from said logarithmic transformation (see Zare, column 12 lines 1-3). Zare does not teach testing said resulting array for a first negative or nil value; forming a new array ending at one value before said first negative or nil value; or performing a logarithmic transformation on said new array.

Collins teaches testing said resulting array for a first negative or nil value (see Collins, column 5 lines 43-55); forming a new array ending at one value before said first negative or nil value (see Collins, column 5 lines 43-55); and performing a logarithmic transformation on said new array (see Collins, column 7 line 68 – column 8 line 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Zare to include the teachings of Collins because using the above specified method would have allowed the skilled artisan to generate spectral data corrected for background level and ascertaining the background level with minimized bias and catastrophic occurrences (see Collins, column 2 lines 30-37).

Referring to claim 24, Zare teaches a method for determining an exponential decay rate of a signal in the presence of noise (see Zare, column 7 lines 12-15), said method comprising: receiving an exponentially decaying signal (see Zare, column 7 lines 37-42); digitizing said signal (see Zare, column 7 liens 37-42); removing an estimated noise value from said signal (see Zare, column 7 lines 28-30); scaling said cutoff point by a factor greater than unity (see Zare, column 7 lines 25-27); and determining said decay rate of said signal (see Zare, column 12 lines 1-3). Zare does not teach identifying a cutoff point associated with said signal; determining a new estimated noise value; removing said new estimated noise value from said signal; identifying a last point of said signal before a negative or nil valued data point on said resulting array; or performing a logarithmic transformation.

Collins teaches identifying a cutoff point associated with said signal (see Collins, column 5 lines 43-55); determining a new estimated noise value (see Collins, column 4 lines 46-53); removing said new estimated noise value from said signal (see Collins, column 4 lines 56-59); identifying a last point of said signal before a negative or nil valued data point on said resulting array (see Collins, column 5 lines 43-55); and performing a logarithmic transformation (see Collins, column 7 line 68 – column 8 line 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Zare to include the teachings of Collins because using the above specified method would have allowed the skilled artisan to generate spectral data corrected for background level and ascertaining the background level with minimized bias and catastrophic occurrences (see Collins, column 2 lines 30-37).

4. Claims 8, 9 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zare et al. (U.S. Patent No. 6,532,071) (hereinafter Zare) in view of Collins et al. (U.S. Patent No. 5,291,476) (hereinafter Collins) and further in view of Karkar et al. (U.S. Patent No. 4,745,279) (hereinafter Karkar).

Referring to claims 8 and 9, Zare and Collins teach all the features of the claimed invention except for subtracting a DC level.

Karkar teaches subtracting a DC level (see Karkar, column 5 lines 3-5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Zare and Collins to include the teachings of Karkar

because subtracting out a DC level would have allowed the skilled artisan to determine the absorption of the light sample.

Referring to claim 22, Zare teaches a method for processing a data record to determine an associated decay rate of a species in the presence of noise (see Zare, column 7 lines 12-15), said method comprises: determining a time associated with a portion of said data record, said end time having a corresponding value (see Zare, column 9 lines 19-21); averaging data points from said time value to the end of record (see Zare, column 14 lines 37-39); subtracting said value from each data point from said data record to create a new data record (see Zare, column 7 lines 28-30); and determining a decay rate from said logarithmic transform (see Zare, column 12 lines 1-3). Zare does not teach subtracting a DC offset from said data record; determining an end point for said new data record associated with a first data point before a first negative of nil data point of said new data record; or logarithmically transforming said new data record.

Collins teaches; determining an end point for said new data record associated with a first data point before a first negative of nil data point of said new data record (see Collins, column 5 lines 43-55); and logarithmically transforming said new data record (see Collins, column 7 line 68 – column 8 line 2).

Karkar teaches subtracting a DC offset from said data record (see Karkar, column 5 lines 3-5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Zare to include the teachings of Collins because using the above specified method would have allowed the skilled artisan to generate spectral data corrected for background level and ascertaining the background level with minimized bias and catastrophic occurrences (see Collins, column 2 lines 30-37), and to further include the teachings of Karkar because subtracting out a DC level would have allowed the skilled artisan to determine the absorption of the light sample.

Allowable Subject Matter

5. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(a) Lehmann teaches a ring-down cavity spectroscopy cell using continuous wave excitation for trace species detection.

(b) Bomse teaches phaseless wavelength modulation spectroscopy.

(c) Coetzee teaches adaptive filtering of physiological signals using a modeled synthetic reference signal.

(d) Zare et al. teach analog detection for cavity lifetime cavity spectroscopy.

(e) Ueberreiter et al. teach a method for reconstructing linear structures present in raster form.

(f) Yan et al. teach trace gas detection with CW cavity ring-down laser absorption spectroscopy.

(g) Dudek et al. teach using CW-CRDS for trace gas detection.

(h) Daponte et al. teach detection of echoes using time-frequency analysis techniques.

(i) Himet et al. teach an adaptive noise canceling system used for beam control at the Stanford linear accelerator center.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Kate B Baran whose telephone number is (703) 305-4474. The examiner can normally be reached on Monday - Friday from 8:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S Hoff can be reached on (703) 308-1677. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

MKB

MARC S. HOFF
SUPERVISORY PATENT EXAMINER
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